

THE LOWER JAW OF THE LABYRINTHODONT FAMILY BRACHYOPIDAE

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ABSTRACT

A well preserved labyrinthodont mandible referable to the brachyopid *Brachyops allos* Howie, 1972, has been found in Queensland. Mandibular characteristics not previously reported are the exposure of the articular on the dorsal surface of the retroarticular process, a posterior extension of the angular beneath the retroarticular process, and the presence of relatively few large teeth which curve inwards.

INTRODUCTION

The lower jaw in the brachyopid labyrinthodonts is not well known. *Haddockosaurus bradyi* has the most completely preserved and fully described jaw (Welles, 1947). A labial view of the almost complete jaw of *Bothriceps australis* is figured by Watson (1956). Poorly preserved lower jaws have been assigned to *Batrachosuchus* sp. by Watson (1956), *Batrachosuchus concordi* by Chernin (1977), *Blinasaurus henwoodi* by Cosgriff (1969) and *Blinasaurus townrowi* by Cosgriff (1974). Within the superfamily Brachyopoidea Rusconi (1951) has described the lower jaw of *Pelorocephalus* and Bystrow (1938) the lower jaw of *Dvinosaurus*.

In a previous paper (Howie, 1972) I described the skull of a brachyopid labyrinthodont, *Brachyops allos*, from a new locality in the early Triassic Rewan Formation of Queensland. This part of the Rewan Formation is now known as the Arcadia Formation (Jensen, 1975). In a subsequent field trip parts of the left and right mandibles of a brachyopid amphibian were found at the same site as the skull of *Brachyops allos*.

DESCRIPTION

The right mandible QMF10118 consists of the anterior part of the dentary from the symphysis to the anterior border of the adductor fossa, and a small part of the angle of the jaw. The left mandible QMF10119 (Pl.1, Fig.1) lacks a section in the region of the anterior coronoid and most of the angle of the jaw. The missing section in the anterior part of the jaw is probably longer than shown in Fig. 1. The curvature and size of these

lower jaws match the upper jaw of *B. allos* and the teeth of upper and lower jaws are similar in size, shape and number. For these reasons I have referred QMF10118 and QMF10119 to *B. allos*.

Cosgriff (1969) notes that lower jaws of the superfamily Brachyopoidea all have a posterior meckelian foramen and angular-prearticular suture on the ventral surface or very low on the lingual surface. The angular-prearticular suture is mid ventral in *B. allos*, while the posterior meckelian foramen is 2 mm above the ventral

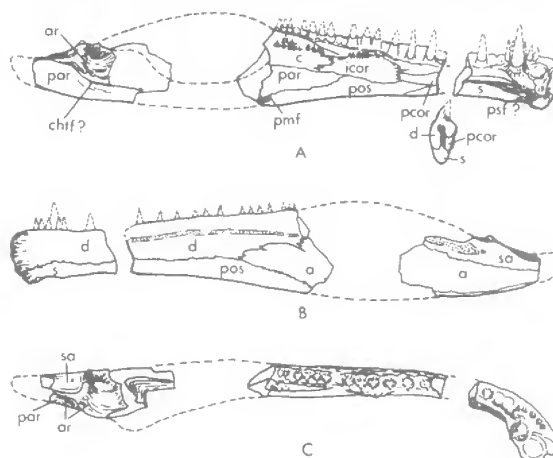


FIG. 1. *Brachyops allos* QMF10119. Reconstruction of left mandible. A, lingual, B, labial, C, dorsal. All x 1. Abbreviations. QMF: Queensland Museum Fossil, UTGD: University of Tasmania Geology Department, a: angular, ar: articular, c: coronoid, d: dentary, icor: intercoronoid, par: prearticular, pcor: precoronoid, pos: postsplenial, psf: postsymphyseal foarmen, s: splenial, sa: surangular.

surface. The jaw is not markedly bowed upwards ventrally as in *Blinasaurus townrowi* Cosgriff (1974) or *Batrachosuchus concordi*, Chernin (1977) but the labial edge of the adductor fossa is bowed dorsally so that the glenoid fossa is set low on the jaw relative to the upper edge of the adductor fossa, a situation found also in *Blinasaurus townrowi*. The jaws are deep in the region of the adductor fossa, but shallow anteriorly with their anterior parts being more rounded in cross section.

The arrangement of the dermal bones of the mandible is typical of that found in other Triassic labyrinthodonts except in the region of the retroarticular process. This is elongate and consists of the prearticular linguallly, and the angular and surangular labially. The most posterior part of the surangular is missing. From above it can be seen that a tongue of the articular extends backwards between the surangular and prearticular — a situation which I found to be present in all brachyopids (see discussion). The dorsal surface of the surangular is not deeply recessed for the depressor mandibulae muscle, and in this the jaw differs from the other brachyopids, especially *Blinasaurus townrowi*.

No well defined chorda tympanica foramen is present, but a break in the bone below the glenoid fossa shows a narrow foramen entering the prearticular and running as a canal below its surface.

LABIAL VIEW. The labial surface of the jaw is ornamented in a ridge-groove pattern which is marked on the angular and surangular, indistinct on the splenial and postsplenial and not present on the dentary except near the symphysis where there is some pitting in the sculpture presumably marking the centre of ossification of the bone. The sensory canal system is represented by an oral sulcus on the surangular and the posterior two thirds of the dentary.

The splenial and postsplenial occupy the lower third of the labial surface. The angular covers less of the labial surface than it does in many labyrinthodonts. Its ventral suture with the prearticular can be seen in a labial view. Posteriorly the angular extends beneath the surangular towards the back of the retroarticular process. The surangular bears a broad section of the oral sulcus below the glenoid.

LINGUAL VIEW. In lingual view the splenial and postsplenial occupy the lower half of the jaw in front of the posterior meckelian foramen. The splenial is separated from the dentary by a groove which is several millimetres deep at the symphysis

but becomes shallow and finally disappears before the splenial meets the postsplenial. An expansion of this groove a centimetre behind the symphysis may be a post-symphyseal foramen. Above the splenial anteriorly is the dentary, while more posteriorly are the three coronoid bones. The precoronoid is small and toothless. The well developed intercoronoid and coronoid project linguallly away from the dentary and both bones bear small labyrinthine teeth. On the posterior border of the coronoid a section of the adductor fossa is preserved.

The anterior part of the prearticular sutures ventrally with the postsplenial and dorsally with the two posterior coronoids. Posteriorly the prearticular occupies the whole of the lingual side of the retroarticular process. The angular is not exposed on the lingual surface.

DENTITION. One symphyseal tusk is present on QMF10118 and one on QMF10119. These are circular in cross section in contrast to the marginal teeth which are elongated across the jaw. In the region of the tusk the marginal teeth are small averaging 2 mm in maximum width at their base. More posteriorly this measurement increases to 4 mm with these larger teeth being found above the pre- and intercoronoids. Above the coronoid the teeth again decrease in size and the most posterior of the teeth preserved are as small as those near the symphyseal tusk. As is usual among the brachyopids the teeth are relatively few in number and many of them are curved inwards. The teeth are attached to the dentary both ventrally and ventrolaterally, a condition which resembles the pleurodont condition often associated with reptiles.

DISCUSSION

The posterodorsal tongue of articular which extends between the surangular and prearticular to the back of the retroarticular process is unusual for Triassic labyrinthodonts but has been seen in the Permian *Trimerorachis* and *Eryops*. The survey below of the other brachyopids shows that this may be present in all of them, presumably as a primitive character retained from Permian ancestors. Watson (1956) labelled the posterior end of the retroarticular process of *Bothriceps australis* as articular and described the retroarticular process as 'made from the articular, covered laterally by the surangular and angular, and mesially by a prearticular...' while in the same paper he describes and illustrates a similar situation in *?Batrachosuchus*. Chernin (1977)

notes that in *Batrachosuchus concordi* the articular extends posteriorly 'to the limit of the retroarticular process', but does not say whether the extension is dorsal, labial, or lingual. No articular has been labelled or described in *Hadrokkosaurus bradyi* by Welles & Estes (1969) while *Blinasaurus henwoodi* was described by Cosgriff (1969) from an internal mould which shows little sutural detail. In April 1980 I examined *Blinasaurus townrowi* material in Hobart and found two specimens in which the articular appears to extend as a posterior tongue between prearticular and surangular. UTGD87805 shows the condition well, while in UTGD85700, although some of the area is covered in plaster, there are indications of a posterior extension of the articular. Illustrations of the lower jaws of members of the brachyopid family Chigutisauridae by Rusconi (1951) show that a posterior extension of the articular may be present but the situation in the family Dvinosauridae cannot be determined from Bystrow's (1938) description. I conclude that this type of retroarticular process is found in the family Brachyopidae but not necessarily throughout the superfamily Brachyopoidea.

The angular of *Brachyops allos* extends to the back of the retroarticular process on the labial side. This is seen also in *Hadrokkosaurus bradyi*, *Blinasaurus henwoodi*, *B. townrowi*, ?*Batrachosuchus* sp. and *Batrachosuchus concordi*, but not in the Chigutisauridae or *Dvinosaurus*.

This description of *B. allos* and subsequent discussion leads to an expansion of previous definitions of the type of mandible found in the family Brachyopidae. The mandible differs from that in other labyrinthodonts in possessing the following combination of characters: retroarticular process elongate, posterior meckelian foramen and angular-prearticular suture on ventral surface or very low on lingual surface, articular exposed on the dorsal surface of the retroarticular process between surangular and prearticular, angular extending posteriorly far along the undersurface of the retroarticular

process, dentition characterised by a relatively few large teeth which are curved inwards.

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MEMOIRS OF THE QUEENSLAND MUSEUM

PLATE 1.

BRACHYOPS ALLOS QMF10119.

Left mandible. A, lingual, B, labial, C, dorsal. All x 1.

